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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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EXAMINER

TRAN, BINH X

ART UNIT

PAPER NUMBER

1765

DATE MAILED: 03/17/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/720,720

Applicant(s)

SPITZ ET AL

Examiner

Binh X Tran

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1765

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 03 February 2003.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 16-25 and 27-35 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 16-25 and 27-30 is/are allowed.
- 6) ☒ Claim(s) 31, 33 and 35 is/are rejected.
- 7) ☒ Claim(s) 32 and 34 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of
- 1 ☐ Certified copies of the priority documents have been received.
- 2 ☐ Certified copies of the priority documents have been received in Application No. _____.
- 3 ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 31, 33 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lee et al. (US 6,211,010) in view of Takenaka et al. (US 6,077,451) and further in view of Choi (US 6,432,838).

Lee discloses a method for etching comprising the steps of:

selectively etching the silicon element (i.e. polysilicon) with a gaseous etching medium comprising ClF_3 (aka chlorine trifluoride) (step 404 of Fig 4 and col. 5 lines 62-65);

exposing, subsequent to the selective etching, the silicon element to a heat treatment in a vacuum at an elevated temperature (Step 407, Fig 4).

Lee fails to disclose that the etching step forming a gaseous reactive by products. However, Lee clearly discloses the step of etching the same material with applicant using the same etchant (i.e., etching silicon using ClF_3). In a method for etching silicon material, Takenaka discloses that the silicon element is etched with ClF_3

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invention, to modify by forming a gaseous by product because it is easy to remove this gaseous by product by pumping it out of the chamber.

Lee also fails to disclose the step of exposing the silicon element to a first heat treatment in a vacuum at a first elevated temperature. In a silicon etching method using ClF_3 , Choi discloses the step of heating the silicon element in a vacuum before the step of etching using ClF_3 to control the etch rate (col. 5 lines 25-33). It would have been obvious to one having ordinary skill in the art, at the time of invention, to modify Lee/Takenaka in view of Choi by heating the silicon element to the first elevated temperature because it will help to control the etch rate.

Respect to claim 33, both Lee and Choi disclose that the heat treatment is accomplished in a vacuum lock chamber.

3. Claim 35 is rejected under 35 U.S.C. 103(a) as being unpatentable over Lee, Takenaka, Choi in view of Farnworth (US 6,136,137).

Respect to claim 35, Takenaka discloses that the selective etching step remove (or eliminate) the contaminant (read on impurity) of the polysilicon layer (read on crystal lattice of the silicon) (col. 5 lines 45-50). However, Takenake does not disclose that the silicon surface is sawn-out part of a silicon wafer. In a semiconductor method, Farnworth teaches the substrate surface can be a sawn-out part of the silicon wafer (Fig 2, col. 4 lines 58-67). It would have been obvious to one having ordinary skill in the art, at the time of invention, to modify Lee, Takenaka and Choi in view of Farnworth by

substitution of one for the other would produce an expected result. Further the use of sawn-out part of a silicon wafer is well known in the semiconductor art.

Allowable Subject Matter

4. Claims 16-25, 27-30 are allowed.
5. Claims 32, 34 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Response to Arguments

6. Applicant's arguments with respect to claims 31-35 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

7. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any

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the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

8. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Binh X Tran whose telephone number is (703) 308-1867. The examiner can normally be reached on Monday-Thursday and every other Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Benjamin L Utech can be reached on (703) 308-3836. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 872-9310 for regular communications and (703) 872-9311 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0661.

Binh X. Tran
March 12, 2003


BENJAMIN L. UTECH
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER